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ABSTRACT

Based on the experiences of using computer-assisted reading instruction in middle schools, this pamphlet proceeds from the conviction that the use of a computer helps middle school students improve their reading. Following an introduction, the booklet is in seven sections: (1) Why Use Computers in Middle School Reading? (2) Software--The Heart of the Matter; (3) Managing Computer-Assisted Instruction in the Reading Classroom; (4) The Reading/Writing Connection: Word Processing; (5) Using Computers for Middle-School Remedial Reading; (6) Some Other Computer Considerations; and (7) Resources. (SR)

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Using Microcomputers for Teaching Reading in the Middle School

Rosemary Lee Potter

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ROSEMARY LEE POTTER

Rosemary Lee Potter, a veteran of 28 years of classroom teaching, is currently a reading specialist at Safety Harbor Middle School, Pinellas County Schools, Clearwater, Florida. Her introduction to computers was a programming course during her doctoral work at the University of Miami. She has since authored the text of software on propaganda techniques and has received two mini-grants for hardware and software, enabling her to provide computer experiences for the 125 students in her middle-school reading classes.

Potter, along with two colleagues, developed and presented an in-service workshop in her district called "Boot Camp," dealing with word processing, K-12. She also initiated and sponsored the Computer Writing Club at her school and is now co-sponsoring a multi-use Computer Club. Potter's most recent project, sponsored by the Florida Department of Education, is the "Florida/England Connection," a telecommunications reading project involving her middle-school reading classes and reading classes in an English school.

Potter is the author of fastback 208 *Using Television in the Curriculum*. She is a member of the Clearwater-St. Petersburg Florida Chapter of Phi Delta Kappa.

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by
Rosemary Lee Potter

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Introduction

Eight years ago a middle-school reading teacher was considering getting a computer for her five sixth-grade classes. After all, there already was a math computer lab down the hall. Why not a computer to help students in reading? If not a lab, why not at least one computer for her room? The school administrator asked that blunt first question, "If you get one, what will you do with it?" Would the computer be a writing tool, a tutor, a motivator, or a teacher? With planning and some trial use, the computer that entered that reading teacher's classroom eventually assisted her students and her in all those roles and many more.

Even though computers are now commonplace in American schools, many middle-school reading teachers have not yet plugged this valuable tool into their instructional plans. There are reasons for this: constraints of rigid scheduling, pressures to make the curriculum more rigorous, mandates to increase time on task, and concerns about meeting state assessment reading standards, to name a few. Perhaps the most compelling reason of all is the quixotic nature of middle-school students. Being preoccupied with all of these matters might explain why middle-school teachers have been reluctant to consider using innovative technology for reading instruction. The irony, however, is that computers have the potential for helping reading teachers deal effectively with all of these factors.

But there are other questions. In what specific ways can the computer assist reading instruction? Will reading scores improve? How

do you serve 125 students in five classes with one computer? How does the computer use mesh with regular studies, required textbooks, class period length? How is software selected? How about evaluation? Are computers really worth the effort?

The answers to these and other questions are found in this fastback, based on the experiences of one middle-school reading teacher (the author), who uses computer-assisted reading instruction and is convinced that the computer helps middle school students improve their reading.

Why Use Computers in Middle-School Reading?

There's no question but that computers are found in some schools because it's trendy. We are told we live in the Age of Technology, so we better have computers in our schools. In some places parent groups have exerted pressure to get computers into the schools out of fear their children will fall behind. Some schools have run fund-raising campaigns in order to obtain just one computer set-up – a computer keyboard, monitor, disk drive, and printer. Although the price of computers has come down considerably, they are still a significant item in any school budget. So are computers for middle-school reading an expensive, high-tech frill?

Having computers in a reading class, like having tape recorders and television sets in a school, must serve some valid instructional purpose. So what can computers offer both teachers and students that will make a difference in teaching and learning? There are at least three factors to consider in determining whether computer-assisted instruction in middle-school reading is worth the fuss: 1) as a time-saver, 2) as a skills builder, and 3) as a motivator. Let us examine each of these factors in turn.

The Computer as Time-Saver

There is never enough time in a reading class period to teach all that needs to be taught or to help everyone who is having difficulty. If any tool or technique can be used that will stretch the use of pre-

cious time, that will make each minute more profitable, and that will give students who need help immediate feedback, then it should be considered. Some middle-school reading teachers are reporting that the computer is exactly the tool they need.

Consider the situation last Friday in one class of 25 seventh-graders where the teacher had just taught and then reviewed a whole-group lesson on the skill of understanding cause-and-effect. When the practice lesson is handed in, it is clear that four students do not understand the concept at all. Furthermore, two students were absent and a new girl, Carol, just joined the class. This makes a total of at least seven students who on Monday will need a lesson on cause-and-effect. And what about the 18 students who demonstrated mastery of the skill and are ready for an extended lesson or to move on to some new task entirely?

On Monday there will be less than an hour to address the various instructional needs on the teacher's lesson plan for the period: make-up, introduction, review, retesting, and application. How will the teacher accomplish all this? One way is with a computer. First, by using a special overhead projector panel connected to the computer keyboard, the teacher can display the computer program on cause-and-effect on a wall screen; or she can display the program by hooking the computer up to a large TV monitor. Either way, the entire class can see the computer lesson. She could even print out a copy of one screen for students to read. She then takes the entire class through a portion of the program, which will be a review for most but an introduction for the two absentees and Carol, the new student. Then she assigns the two absentees in turn to finish the program seated at the computer and goes on with the rest of the class. If there is time, Carol can use the program with the help of another student who has mastered the skill. Later the teacher checks the computer's record to see how the three of them have done and whether they need additional help. The four students who definitely did not understand on Friday can be paired up for a computer round of review and practice, if not Monday, then Tuesday.

Over the next several weeks, the teacher may send most of the students to the computer for a review and testing, while she moves on to other skills or concepts. Thus, we can see how a computer in a middle-school reading class, if properly used, allows a teacher to maintain control of instruction and to double up the time on task of both students and teacher, making it a cost-effective way to maximize instructional contact.

The Computer as Skills Builder

Teaching reading at the middle-school level is more than instruction in a collection of reading subskills. Improving reading at this level is a complex process calling for a mix of specific skills, vocabulary development, increased reading rate, and a variety of comprehension techniques. These aspects of reading, of course, are the very ones assessed on district- or state-mandated achievement tests, so they are an ever-present concern to reading teachers.

Reading teachers who have used computers to practice reading/thinking skills and comprehension as part of their everyday classroom instruction are realizing that they can provide more directed reading practice than they otherwise would. As a result, certain middle-school groups show promise of actually increasing their reading scores. If computers can help middle-school reading teachers improve their students' reading scores, that alone is reason enough to plug them in. Keep in mind, however, that a computer is only as good as the software program it delivers. More on this later.

The Computer as Motivator

If anything can capture the attention of the middle-school student, even those labeled at risk, then it deserves careful consideration. We have plenty of firsthand evidence that computers are attention grabbers. Walk through a shopping mall and observe the concentration these students display playing video games. Let them tell you about

computer games they play at home – math games, word games. Some will have done word processing on their home computer. A few may even have done some computer programming. The simple conclusion is that computers are great motivators for young people. It remains for the school to capitalize on this motivational power for using computers in the classroom.

Even without much previous computer exposure, middle-school students like using computers – even when the purpose is instructional. They enjoy the engagement of a computer program that reteaches a skill on which they need help. They may hate to do a worksheet on context clues but will do dozens of exercises on the computer, which immediately feeds back reward or error messages. They may hate writing a couple of paragraphs on paper but will use a computer and fill the screen with personal prose.

What's happening here is power – the power to control the pace of one's work and to receive immediate feedback. Students feel they are in charge, directing the flow of their own learning and interacting with the computer's response to their input. This is different from the typical classroom situation where the teacher seems to be in charge of everything – presentation, questioning, responses, rewards – and for everybody in class. How can the teacher know that Keri just blew number four on her ditto sheet, tell her why, reroute her, and at the same time tell Bill across the room that he got it right and say, "Super!" The computer can do this.

As for discipline, the computer exerts another kind of power. Most students are eager for their turn at the computer. If there is misbehavior at the computer (rare), one missed turn is an effective deterrent to future misdeeds. And the reticent student who hesitates to answer in class or the one who spends more time chatting than thinking tends to flourish at the computer. Perhaps the power rests in the clear focus of attention and continuing responses demanded by the computer. Perhaps it is competing with yourself for a better score than you made the last time you worked on the computer, or the boost

to your self-esteem when the computer screen immediately flashes, "Unbeatable!" in praise of your correct work. This is a power a teacher finds difficult to maintain while working with an entire class.

Whatever the sum total of the computer's attractive power for middle-schoolers, it comes through most tellingly in David's howl when he misses his turn at the computer, in Phil's grudging aside when someone seems to be wasting keyboard time, and in Jennifer's pestering the teacher about when her turn on the computer is coming (even though it is posted on the schedule). And then there is Jose who is frequently absent, but never on his computer turn day. Perhaps Ken, who failed reading and had to go to summer school where he spent a third of his time in computer-assisted reading instruction, said it best:

> Students don't usually want to read books or do work. So all you have to do is get them on computers with some work! They'll enjoy it because I do. I thought it was a pretty good idea to let us work on computers. To stop most kids' problems they should get more computers in school to stop all of the skipping school and quitting.

A computer is not a panacea. However, more and more teachers are concluding that if it can save learning time, if it holds the prospect of improving reading scores, and if it is highly motivating to even problem learners, it belongs in the middle-school reading classroom.

Software – The Heart of the Matter

Software is everything. Without quality software, a computer is useless. If your school doesn't yet have computers, don't even think of requisitioning computer hardware until you first have conducted a search of the available software, because the software you select will, in most cases, determine the hardware you will need. So where does the software search begin?

The software search for middle-school reading begins with your reading curriculum objectives. The software must support the regular reading instruction program. If the objective is increasing students' active vocabulary through review and practice, the software must offer students the opportunity to do just that with the specific vocabulary the students must learn. If the objective is learning specific reading skills, such as recalling detail or using context clues, then software selected should provide review and practice in those skills. If the objective is to improve comprehension, then the software must provide a variety of exercises on different types of comprehension. While there may be 100 pieces of software on the market dealing with reading at the middle-school level, perhaps only 15 actually meet the curriculum needs of your particular class. These are the ones you should purchase.

Beginning the Software Search

A logical place to begin your search is to look through the catalogues published by software producers. They are readily available by writing the publishers. (See the "Resources" section at the end of this fastback). Most software catalogues are organized by subject areas. Find the section devoted to reading and scan the advertising copy to get a general idea as to what a particular software program is supposed to do. But don't stop there. Software is often reviewed and rated in professional journals, computer magazines, and computing newsletters. Read what the reviewers have to say. Check with colleagues in your school or district who already may have tried out the software. They can give you a candid evaluation based on student use – the ultimate test. Also take advantage of the free 30-day preview period some software firms offer. This will let you see if the software lives up to its advertising claims as well as determining if its content, format, and features are compatible with your classroom needs.

Other matters to consider are: Is the software written for the computer hardware currently in use in your school? If the program is to be used in a computer lab, is it available in an economical lab package that can be networked to all the computers in the lab? What memory capacity will the computer need to handle all the data and graphics stored in the program? If a program features color graphics or uses color as an integral part of its format, is the computer monitor capable of handling color? The software catalogues answer many of these questions.

Evaluating Reading Software: What to Look For

It is imperative to have some kind of checklist for evaluating software, even if it is informal. A busy middle-school reading teacher with hall duty, parent conferences, and jam-packed planning periods may think developing an evaluative checklist for software is a formi-

dable task. The good news, though, is that once such a list is developed, it makes it possible to evaluate a piece of software in a few minutes. If the software survives the checklist criteria, the teacher will want to run through the program making notes along the way to refer to when actually using the program with students. Following is a sample checklist for middle-school reading software.

A Sample Checklist

1. Provides review, practice, and testing of vocabulary, reading/thinking skills, and comprehension appropriate for middle-school reading curriculum objectives.
2. Content of written passages is appropriate for middle-school developmental and interest levels. For example, content is selected from literary works studied in class or deals with contemporary themes; content is free from controversy; content avoids gender or ethnic stereotyping.
3. Provides user-friendly directions for carrying out the program, that is, they are readily understood so that students can spend most of their time on reading instruction independent of the teacher.
4. Uses a type size and font-style that can be easily read whether on the computer monitor or on a TV screen.
5. Allows the teacher to customize a practice exercise. For example, a teacher might want to type in specific vocabulary words for a crossword puzzle or use a special list of words for a group of students.
6. Presents practice exercises and test items in formats similar to or the same as those used in required district or state achievement tests.
7. Allows students to move through the program at a pace that is comfortable for them.
8. Has a "book mark" feature that allows students to exit and return to the program where they left off. This feature is important when the bell rings before completing a lesson or when there is a fire drill or power outage.

9. Gives students immediate feedback on their progress. Feedback may be verbal or graphic or both. Whether positive or negative, feedback should be simple, brief, and in a variety of formats.
10. Offers students branching options, a second or third instructional loop, if they need more practice on a particular skill or if they want to move ahead because they already know the material.
11. Provides a sound disabler so that the class is not distracted with musical tones or beeping sounds from the computer when the teacher is presenting a class lesson or when students are reading silently.
12. Has the ability to record students' work by name or class, thus allowing the teacher to retrieve and even print out student or class records.
13. Publisher provides a back-up copy of the program at initial purchase, or gives permission to copy one, in case the original fails for some reason. (Copyright regulations allow a back-up copy to be made, but it can be used only if the original malfunctions.)
14. Provides a teacher's guide covering both the details of the program and how to use the program in the reading class. (Some software producers provide a toll-free 800 phone number to call should a problem arise.)
15. Provides follow-up worksheets or projects for applying skills and concepts taught on the computer program.
16. Is priced competitively. (Comparison shopping might result in large discounts from local distributors rather than purchasing through catalogues.)

In addition to published reviews, teacher recommendations, and checklists, the very best way to evaluate software is to go through the program yourself giving both correct and incorrect responses to the program's instructions to see what happens. Only then can you determine if the software lives up to its advertised claims and if it is appropriate for your reading class. If possible, have one or two students try out the program to see if there are any "bugs" in it, and find out how long it takes them to complete it. With a trial run, the teacher can quickly determine how the program can be scheduled for computer-assisted lessons in the classroom.

Managing Computer-Assisted Instruction in the Reading Classroom

The first consideration in classroom management is the placement of the computer(s). A computer is a tool and should not distract from other activities going on in the classroom, nor should it be a traffic barrier. Try to place it where non-users cannot see the screen. Avoid placing it on the route to the ever-popular pencil sharpener. You might be fortunate to have a rolling table to hold the computer components. This will give you some flexibility as to where you place the computer workstation. The ideal situation is a built-in computer carrel at the side or back of the room.

Student Orientation

As in learning to use any new tool, students need an orientation on how to run the computer. Along with a demonstration, students need hands-on experience in how to insert disks and how to start or "boot up" the program as well as basic information on caring for the equipment. Some students will already be experienced in doing these things and will chime right in without any prompting. Take advantage of this expertise and enlist these students to help the uninitiated. Fortunately, most middle-schoolers catch on fast when given the chance to use the computer.

Basic orientation should take only one period. This can be done using an overhead projector with the whole class. A better way is

to spend about 15 minutes with groups of four to six students at the computer itself. This affords students a close-up view and hands-on experience under direct teacher supervision. Of course, if using the small-group approach, the rest of the class must be involved in an assignment so the teacher can work with the small group without interruption.

Either way, the basic orientation includes identificaton of the parts of the computer and a brief description of their functions. Next comes the care and handling of the software disk, how it is inserted, and how to start the program. Introduce computer terminology naturally and use it consistently; the students will soon follow suit. But keep it simple. Remember, you are orienting students to use the computer in a reading class; you are not teaching a course in computer science. Tell students not to turn off the computer while the disk is still in the drive. When using computers in successive classes, some teachers prefer to leave them on, since the on-off switch can malfunction if used too often.

Learning the Keyboard

The reading teacher is not expected to teach typing, although there are some computer programs that do this. However, students do need to become familiar with the keyboard so they don't waste too much time searching for a specific key. Basically this involves keeping the left hand on the left side of the keyboard and the right hand on the right side. A one-minute "search" drill every day for a month or so will help curb the habit of hunting for a key row by row and then striking it with one index finger. Another technique is to give each student a ditto sheet of the computer keyboard. Students keep it in a work folder and can practice on it in their spare time. Then when it comes time for their turn at the computer terminal, they have a basic familiarity with the keyboard.

Fortunately, most tutorial reading skill software requires little typing. Responses more often call for pressing one key, say a letter or

RETURN key. However, there are certain function keys such as ENTER, CONTROL, and ESC (escape or exit) that need to be explained. Moreover, since most computer-assisted tutorial reading programs are self-paced, a student's speed at extended typing is of little consequence.

Introducing the Computer Program

Introducing a specific computer program involves knowing how to start the program, knowing how to enter one's name on the program, knowing how to branch if the program offers some choices, knowing how to record one's score for a practice exercise or a skills test, and knowing how to exit the program at the end of the period. By middle school, students are likely to have had practice on a variety of reading skills and will require only a brief refresher on what to do with a skills exercise on the computer.

Some teachers introduce a new program by booting it up for small groups and then giving students brief notes on what to do. Others connect the computer to a large TV monitor and walk the whole class through the beginning portion of the disk. A third exciting option involves a data projection panel connected to the computer. This relatively inexpensive technology is like a thin, flat computer screen in a frame, which is placed on an overhead projector. The device displays on the wall whatever is on the computer screen. This is an opportunity to put one of your computer "smarties" at the keyboard as the system operator, while you explain the new program.

Scheduling Computer Use

Middle-school reading teachers have a lot to accomplish in each class period. Adding the computer to the regular class routine calls for careful planning and schedule making. By posting a schedule chart with each student's name and class, a student can check the chart on entering the classroom or even before class starts and begin logging

some computer time. When Jenny finishes her turn on a program, she signs out on the chart and on her way to her seat reminds Manuel it's his turn. Most likely Manuel has been keeping one eye on Jenny and doesn't need a reminder.

Using the schedule chart to rotate student turns at the computer is much like rotating reading groups in the elementary classroom. Here, though, the student leaves the large group to learn independently at the computer, while the teacher continues working with the rest of the class. At the middle-school level, it is still necessary to give considerable direction if students are to enter and exit the computer without disrupting the rest of the class. The computer has the power to engage students totally, but what may happen en route to the terminal is another story. Without some clear and firmly enforced guidelines, Amy's trek to the computer may be detoured by delivering Ronzel's note from Kathy to Crystal, who sits next to the computer workstation. Nevertheless, by this age students have enough self-direction to follow the schedule chart; and appealing to their sense of equity so everyone has a turn at the computer usually works.

Using Computer Partners

With the current interest in cooperative learning, it makes good sense to have students work as partners at the computer. At the middle-school level, the key to making this work is letting students choose their own partner or "study-buddy." Partners are usually boy-boy and girl-girl, with the occasional budding romance duo. Using partners will, of course, mean some revamping of the schedule chart. Partners can help each other as they learn by comparing notes, by reminding each other about how certain computer commands function, and by evaluating each other's work. With a friendly critic at your side, there is less chance to "goof up" in front of everybody – a great fear of middle-schoolers.

By using partners, the teacher increases time on the computer, since double turns move the list of students through rotation faster. Each

student learns as an individual by silently reading the lesson content on the computer screen. But then as partners, there is a quiet joint effort to determine the correct responses. Partners also take turns at the keyboard. How gratifying it is to watch a shy Marni and a boisterous Chuck respond when they see their correct responses answered on the screen with "Way to Go!" or "Fantastic!" Marni is all smiles. Chuck is caught being involved as he exclaims, "Yo!"

How About a Computer Tutor?

As noted, some students come to reading class with computer expertise. Some have had computer instruction elsewhere, and some have just been messing around with computers at home. Take Frank, who is repeating seventh grade. He learned to use the computer last year in this very class and "knows it all" now. Ever zealous, he keeps a constant watch over the computer station and volunteers to help whenever a student shows the least hesitancy. Frank really needs to spend more time on his own work, but he can be very helpful and at the same time bolster his self-esteem. Students like Frank are ready and eager to help classmates use the computer. Let them help you.

Develop a short trouble-shooting list and post it next to the computer so everyone knows what to look for if the computer won't turn on or the disk drive won't start the program. If your trouble-shooting instructions don't work, include on the list the names of two or three computer tutors like Frank who might be able to solve the problem without your having to interrupt what you are doing to walk across the room to do such a simple task as plug in the disk drive. Computer tutors need some brief training; but after a month or so of being "on call," the need for their services is likely to diminish as everyone gains more computer experience.

How much time will a student actually get at the computer keyboard in a reading class? In a class of 25 students with one computer and using a partner system and regularly scheduled rotations at the computer, a student would spend about 4½ hours a month at the com-

puter. This may not seem like very much time; yet if you consider that students spend only about 20 hours a month in the reading classroom if present every day and without interruptions for assemblies, pep rallies, or field trips, then it is a good exposure to an efficient instructional mode. And when you consider that computer-assisted reading lessons are intense and require the student's complete attention to the task at hand, perhaps the focus should be on the learning outcomes, not on the number of minutes at the computer keyboard.

Of course, computer use with the whole class using an overhead display panel adds considerably to computer exposure time, as does having more than one computer in the classroom. In the final analysis, computer exposure in the middle-school reading classroom depends on the teacher's mastery of scheduling. Having a dozen computers would make life much easier.

The Reading/Writing Connection: Word Processing

These days the teaching of writing is an integral part of the middle-school reading program, and so is the attendant struggle to get students excited about such aspects of the writing process as revising and editing. Once students discover how easily they can add, delete, revise, and correct using a computer word-processing program, they become excited about writing. Gone are the illegible "sloppy copy" efforts full of erasures and cross outs. Instead, there is the fun of manipulating blocks of text, inserting words, rephrasing sentences, rearranging sentences in a paragraph, or even wiping out whole sections of text – all resulting in a neat, easily read manuscript, even though it may be only a rough draft.

When middle-schoolers take to the keyboard, not only is there more attention to the details of revision and editing, but they actually produce more words on a page than they do with pen or pencil. What is refreshing for the teacher is students' willingness to go back to a piece of writing several times to double-check every detail in the true spirit of editing. When their writing will be printed out on the computer printer for others to read, they insist that it be right.

To promote the "I'm getting published" spirit, I ask for three copies of everything printed: one to be put in a looseleaf notebook for the classroom library, one for the student's writing folder, and one to take home or give away. Lenny reports that his grandmother was overjoyed to receive his computer-generated letter, the first he had ever

written to her. Joanna rushed back into class with her printout in hand frustrated over a minor typo, which neither she nor her reading teacher had caught in proofreading. In anguish, she pleaded, "Will you write me a pass so I can come in between periods to fix it and print it again?" Joanna has really taken to computer-assisted reading and writing and for the first time is showing enthusiasm in reading class. Getting "published" seems to make a difference with Lenny and Joanna!

Students also enjoy working on word processing with a partner, with each acting as an editor for the other. To ensure that each student gets a turn at the computer during a session, I use an oven-timer to signal the time to change keyboard operators. Another useful practice is to give a five-minute warning signal before the end of the session. This allows students time to save their work and exit the computer.

Introducing Word Processing

There are different ways to introduce word processing. One way I have found effective is to pass out ditto copies of a short paragraph with many errors in it (see below).

> Here is a picture of a classr
> oom with no furniteer in It
> if you could make seats four
> the class what wood they look
> lik Bea sure to make a deskt
> op for each student

I then ask the students to take their pencils and correct the errors. After they have done so, I ask them to hold up their corrected ditto sheets so others can see what they look like. It doesn't take long for the class to conclude that the pencil-corrected copies are pretty messy. Then I proceed to demonstrate how corrections can be done using the word-processing functions of the computer, resulting in a clean copy ready for printing. So all can see the computer demonstration, I use the TV monitor or the overhead display panel, which are con-

nected to the computer. I invite students to come to the keyboard to try out the various editing functions, thus making it a cooperative learning project.

Another way to introduce word processing is to have students take notes on the precise steps involved in an editing function. It does not take long for a pair of students at the computer to discover that their how-to notes must be written and followed precisely to get the desired results. All of a sudden, reading for detail becomes important. Students soon come to realize that with the notes they can control what they want to do at the computer. Partners compare notes as they hunt for the solution to a small problem they are having – a real reason to read. It is very satisfying to find the key or combination of keys that brings up the desired result on the computer screen – without asking the teacher for help.

As the year progresses and students gain more experience with word processing, they come to view the computer as a tool for communicating. The keyboard becomes a place for batting out ideas on any topic. Requests for time at the computer multiply: "Can I write a letter to my mom?" "When can I have a turn to finish my story?" "I want to write a scary story for my little brother."

Motivating Student Writing

Students need the experience of composing at the keyboard. However, in the limited time of a reading period, it may be necessary for students to do a handwritten first draft and use their computer time to enter it and then revise and edit. One way of giving students experience in composing when there is limited computer time is a "relay team" story. One student begins a story by writing two or three sentences. Then other students follow in succession, each adding a few more sentences until the story is completed. Printing out the story and reading it aloud makes for an enjoyable class activity.

There also are writing programs that provide story "starters," which present the beginning elements of an adventurous story plot. Students

take these beginning elements and build on them to create a finished story. Some of these programs include graphics, which can spark the imagination and inspire that all-important first sentence.

Desktop Publishing

From basic word processing, middle-school students can move rapidly into what is called desktop publishing. This involves much more than individual students writing their own stories on the computer. Now the expressive output of a class or even an entire grade level can be published as a class or grade-level newsletter or even as a school newspaper, complete with masthead, headlines, and computer graphics illustrations.

The desktop publishing program allows students to do page layouts with professional flair. Students can devote most of their time to gathering news, writing it up, and editing it and leave the time-consuming chore of layout to the computer, which prints out a camera-ready page that can be duplicated on a copy machine and distributed to the class or the whole school. Such a project accomplishes several objectives in the reading/writing curriculum.

Handy References for Writing and Editing

Students composing at the computer should have a dictionary and a thesaurus handy. When working as partners, one student can look up the spelling of a difficult word while the other types at the keyboard. The same goes for using a thesaurus when looking for the precise word to express an idea. Spelling-checker programs also are available to help students with spelling. These programs highlight misspelled words in the text, thus alerting the student that he should check the spelling in a dictionary. These same programs also can serve a diagnostic purpose in that the teacher can see what kind of spelling errors are being made and then follow through with direct teaching of commonly misspelled words.

Using Computers for Middle-School Remedial Reading

The previous chapters have dealt with using computers in regular middle-school reading classes. Can computers also be effectively used with remedial reading classes at this level? I had an opportunity to find out a few years ago when I was invited by my school district to develop and teach a summer-school computer-assisted reading program for students in the sixth to eighth grade who had failed reading the previous school year, or who had not passed Florida's State Student Assessment Test – Reading.

This assignment also provided an opportunity to conduct an experimental research project comparing reading achievement of two classes of students using computers with students in control classes who did not have computers. Both the two computer (experimental) classes and the control classes met for 2½ hours a day for 24 days. They also used the same reading texts, materials, and tests. The difference was that the computer classes had the use of 10 Apple computers with tutorial reading software to use for approximately a third of each class session. At the end of the summer session, reading achievement of the computer classes would be compared with the control classes using the California Test of Basic Skills (CTBS). This research project extended over two summers with a different research design each summer.

Getting Ready

Without much advance notice, I acquired as much tutorial reading software as I could with a very limited budget. I had a few programs

on hand, borrowed some, and searched public domain holdings for a few more, finally coming up with 20 tutorial disks. Almost all of them dealt with reading skills found on either Florida's State Student Assessment Test – Reading or the CTBS reading tests. The reading level of the software ranged from fourth to ninth grade, with interest level generally appropriate for middle-schoolers. (See tutorial software listing in the "Resources" section at the end of this fastback.)

The first day of summer school I braced myself for a group of students who, I felt sure, would resent being there at all. I was pleasantly surprised. They cooperated nicely, even during the more traditional portion of the class when I was doing direct teaching with regular materials. Was it because they knew the last hour or so they would be using computers, albeit with reading skills software? Yes, they were honest in admitting that they could "hang in there" knowing that they would get to use computers soon. No doubt the presence of 10 computers on tables on both sides of the classroom served as a constant reminder as to what was in store for them. Although I never referred to the computers as a reward, the students clearly thought of them that way. They would soon learn, however, that computers are a tool for learning.

Assigning Computers and Software

With 15 to 18 students present any given day, they were sent to numbered computer stations with a partner of choice, depending on what software they would be using. Software was assigned in three ways. The first was simply to assign each student and partner to a computer station with software that had been placed there beforehand. For example, if Julie was having trouble with the vocabulary on her regular reading assignment, she and her partner would be assigned to work with vocabulary review and drill software, sometimes with the actual vocabulary from their reading selection, which I had typed into the program beforehand. A second way of assigning students was according to a list of six software programs that were considered a

"core," which everybody had to do. The third, and by far the most popular, was to give students a free choice. In evaluations conducted at the end of the summer-school session, almost all the students favored the free-choice assignment method. However, I used all three methods, reserving the free choice mostly for the last five days of the summer session. Actually, it didn't matter what software the students selected, since over the course of the summer session they would be required to cover all the software I had provided for them.

Each software disk was coded with a colored dot that matched a dot on a large classroom chart listing all the reading skills to be reviewed. Students were expected to keep a record of the specific skill they were working on. They also recorded their individual scores or levels they achieved for the programs assigned to them. These records allowed both students and the teacher to see the skill or skill level they should work on next.

Needless to say, word soon gets around as to which software programs are the most fun, the easiest, or the hardest. After the first few days, the favorite ones became so popular that it became necessary to post a waiting list to use them. Keep in mind that these were still tutorial reading software! By keeping a careful record of who used what and when, I was able to maintain some semblance of equity when requests came for a favorite program. At the same time, these records allowed me to steer students to some programs that had been avoided because they were perceived to be more difficult.

Changing Roles for Teacher and Students

Managing a remedial reading class using both traditional direct teaching methods and computer-assisted instruction means that you have to change your style of teaching. Increasingly, you assume a role of facilitator. You find yourself moving from computer station to computer station offering suggestions, answering questions, helping with problems. Each stop may only have taken a few seconds.

Just as the teacher changes role, so do the students. The transition from working with traditional materials under the teacher's direction to working with computers changes the whole class configuration into one of partnerships and cooperative learning. These "failing" readers literally turn their backs on the teacher and go to work. Now they are setting their own pace. They stay on task, not waiting for teacher direction. They compete with themselves to improve their own previous scores. They know part of their grade depends on the number of software programs successfully completed. They begrudge each minute the teacher delays the starting time at the computers and openly express this resentment by soundly shutting their books or tapping their watches.

As the summer-school teacher for students who had failed reading, I came prepared to offer support and guidance. For several I was able to back off because they were on their way independently. With the computers, it was like having 10 more instructors on hand. One of the gratifying things was hearing the students explain what they were doing to county office administrators and researchers who visited.

What Did We Find Out?

At the outset, neither I, the teacher, nor the summer-school administrators had high expectations that using computers as part of the instructional delivery mode would show measurable reading progress in a brief five-week period. We did hope, though, that attendance would be better and behavior problems would be less. In fact, this proved to be true. And there was little overt expression of dislike for reading, which some of the other summer-school teachers of the control groups reported. However, the above observations were not reflected in exit attitude surveys administered by the district, which indicated no significant differences between the experimental and control groups in attitudes toward reading, summer school, or school in general.

Despite our initial hypothesis that reading scores would probably not show much difference in five weeks of instruction, the findings were positive and promising. When exit CTBS scores of the computer-assisted classes were compared with the control classes, no significant difference existed on the subtests for vocabulary, reading comprehension, and reference skills. However, the experimental computer-assisted classes did achieve significantly higher in total reading scores than did the control classes.

The second summer the research was limited to just the computer-assisted reading classes. This time the intent was to see if individual students would increase their CTBS percentile ranking as a result of the computer-assisted instruction. Percentile ranking gains or losses would be determined by comparing the spring CTBS scores with the end-of-summer-school test scores.

There were two differences from the first summer's program. Several new tutorial reading skill software programs had been purchased and were used; and in addition to the failing students, the class included a few English-as-a-second-language students and one learning disabled student. Class instruction followed the same procedures used in the first summer-school reading program.

All but two students passed the summer-school reading course. One failed by not meeting the attendance requirements, which allowed only three absences. The other failing student had serious reading problems requiring extended clinical intervention. The analysis of end-of-summer CTBS percentile rankings showed several positive gains. Of the 13 students in the class, 10 increased their vocabulary scores in a range of 3 to 18 percentile points; eight increased their comprehension scores in a range of 3 to 49 percentile points; seven increased their total reading scores in a range of 3 to 29 percentile points. Interestingly, the learning-disabled student was one of two with remarkable gains in comprehension.

Most students had gains in their vocabulary scores. Reference skills had the smallest increase, with only three students improving scores

and eight students receiving lower scores. This may be accounted for by the fact that there was less reference skill software available, and what was offered was less popular with students. Also, that section of the test was offered late in the testing period so test fatigue may have set in.

While this little study can make no claims for dramatic improvement in reading achievement, keep in mind that these were students who had failed reading the preceding year. We did find some reading improvement and certainly some redirection of energy to learning. Certainly, a case can be made for computer-assisted instruction contributing to reading improvement simply by increasing students' time on task and exposing them to far more words. Such is the power of the computer. Obviously, more sophisticated and extensive studies should be conducted as well as classroom action research. I, for one, am not waiting until we have definitive answers from research. Computer-assisted instruction works with poor readers.

Some Other Computer Considerations

In this final chapter I discuss a variety of concerns regarding computer use in middle schools that are relevant to, but extend beyond, the reading program. In middle schools that operate with the instructional team concept, the reading teacher is a key member of the team. The reading teacher can offer the team diagnostic information about students' reading strengths and weaknesses and can support subject matter teachers with advice about direct teaching of content-area reading skills. And if the reading teacher is the first in the school to use computers (as is often the case), he or she can become the resident "expert" and advise colleagues about using computers in other curriculum areas.

Some Thoughts About Gender and Computers

Since the introduction of computers in the schools, there has been concern that girls do not seem to be as interested in using computers as do boys. True, boys are fascinated with computer video games, with their racing cars and creature-eating monsters. And boys who are into computers tend to organize themselves into tightly-knit groups and are not above flaunting their know-how. But computers in the reading classroom are a unisex operation. Reading software is gender free for the most part. Both boys and girls of middle-school age quickly get into word processing and are fascinated with executing

the commands as they compose on the keyboard. Mind you, the topics of their compositions vary greatly. Middle-school boys are prone to writing about gore and violence. Early on, I admonish all my students with, "Please, no blood dripping from the page!" But word processing itself has no gender barriers.

When computers are integrated into the instructional sequence of the reading class, both boys and girls come to accept them as a useful tool for learning. Out-of-class activities in the middle school, such as a Computer Club or a field trip to see computer use in the business world, provide opportunities for all students to become familiar with the use of computers in daily life. Another observation about gender is that most middle-school reading teachers are women. If they are routinely using computers for reading instruction, they are serving as positive role models for both girls and boys and are counteracting any gender stereotyping about computer technology being a "man's world."

A Word About Computer Literacy

In many middle schools there are now courses or units on computer literacy. Sometimes these courses are taught without even having a computer in the classroom! Generally, such courses are designed to develop awareness of computers and include information about how computers work, the role of computer technology in society today and in the future, and sometimes discussion of ethical issues regarding copying computer programs or illegal entry into computer files.

Should middle-school reading teachers be teaching computer literacy? Don't they already have more than they can do trying to help students read better? Actually, reading teachers using computers can do much with computer literacy, both directly and incidentally, without compromising the reading curriculum. The very fact that students have hands-on use of computers in the reading classroom means that they are developing awareness of the computer as a tool for learning. Moreover, since many of the topics covered in computer literacy require

reading, why not put some of this reading material on the computer and use it in the reading class? How sensible to use computer-assisted instruction to learn computer literacy, to gain practice in reading skills, and at the same time have the experience of using a computer!

This is precisely what is happening in my own school district (Pinellas County, Florida). The district supervisors of language arts and computer education jointly prepared a proposal for integrating computer literacy and reading skills for all seventh-grade reading classes as well as foreign language and gifted classes.

To implement the proposal, the district hired a reading/writing team of three elementary teachers of the gifted and one middle-school reading teacher for one month during the summer. They wrote the computer literacy content, integrated it with specific computer and reading skills, and prepared seven software disks for use by the seventh-grade reading teachers. I should point out that none of the the writing team teachers were programmers. They were able to use a teacher authoring program to write the course without the assistance of a computer programmer. Accompanying the software is a brief manual with student follow-up work. This software can be used with the whole class using the large TV monitor or the overhead projection panel, or students can take turns at the classroom computer and use the software on their own. The district is placing a computer in each classroom where the computer literacy course is taught.

What About Teaching Programming?

Some middle-school reading teachers, even those with little computer programming experience, have included some programming among their computer activities. To be realistic, with a limited number of computers in the reading classroom, there is seldom time to use them for programming because it is a concentrated and time-consuming activity. However, it is not unusual to have a few students who come with programming expertise and want to do some programming in class. If computers are available, there is certainly justifica-

tion for allowing this select group, working individually or as partners, to do some occasional programming. The pedagogical justification is quite clear: programming requires powerful applications of many reading skills – details, sequence, cause-and-effect – and demands exacting attention.

Sometimes students dart into reading class, put in their disks from home, and work on them even for a few minutes. Perhaps they want to "debug" some errors. They read intently, statement by statement, trying to determine what to add or delete, what to correct or expand, what to sequence in a different order. In short, they are using the gamut of reading skills in a very concentrated manner. And so are their cronies, hanging over their shoulders reading along and cheering them on.

Of course, having a programmer in your class is a resource you can call on. These are the students who can serve as your computer tutors (if they have some degree of patience with neophytes). They might also be called on to explain to other students the programming involved in computer graphics, word puzzles, and other games used in your classroom. This knowledge sharing allows the programmer to "shine" for a moment and promotes respect for what the computer – and students – can do.

Let the Computer Make Your Life Easier

Once reading teachers (or any teachers, for that matter) have gained some proficiency in using computer software for instructional purposes, they will want to investigate some of the computer utilities or peripherals, which can do all sorts of jobs that will save time and make life easier.

There are inexpensive programs that record grades, tabulate averages, and print out individual progress reports. With a word-processing program, the computer can print out a neat note to a parent and at the same time save a copy in the computer file for future reference. Another file might contain ongoing anecdotal records for

individual students. Lesson plans for substitutes, including standard information about schedules, fire drills, and classroom routines, can be prepared in advance. Revisions and updating are simple with the computer. There are programs that take the time and tedium out of designing crossword puzzles and other word games. There are others that allow the teacher to design and print customized achievement certificates, greeting cards, letterhead stationery, signs, and banners.

One computer utility that really saves time is a program that helps teachers design tests or quizzes in a variety of formats, giving the teacher the option of having a different format of the same test when teaching several sections of a class. These programs will also rearrange the order of items on a test. All this is possible on the computer without retyping.

Just a few years ago, computers were the pioneer technology on the horizon. With the advent of the microcomputer, it became economically feasible to use this technology in the classroom. Each year brings exciting new technology with direct applications for teaching and learning. In this fastback, I have focused on one application of computer technology for middle-school reading in both regular and remedial classes. I invite all reading teachers to plug in the computer and put it to work to help students learn.

Resources

Software

The following software programs are only a sample of those now being used in middle-school reading programs. They are categorized under different headings, but some may be used for more than one purpose. Unless otherwise noted, these programs were written for the Apple computer family. Some, however, may be available in versions for other computers such as Macintosh, Commodore 64, IBM, or Tandy. Many are available from local distributors at a discount price. There is also public domain software that may be copied and is usually quite reasonable or even free. Publishers' addresses follow this listing.

Tutorial Reading/Thinking Skills

Good Thinking (Hoffman)
Please Help Me – Vocabulary (Focus Media)
Multiple Meanings (Hartley Courseware)
Dragon Games (Educational Activities)
Supermind: Critical Reading and Thinking Skills (Educational Activities)

Comprehension Stories, Applied Skills

New Kid on the Block (Hartley Courseware)
Reference Micro Mysteries (Focus Media)
Our Wild and Crazy World (Educational Activities)

Diagnosis of Reading Level/Style

The Reading Style Inventory (RSI) (Learning Research Associates)
Diascriptive Reading III (Educational Activities)
Computer Assisted Reading Assessment (Opportunities for Learning)

Content Area Reading

Where in the USA Is Carmen San Diego (Broderbund)
Understanding Charts & Graphs (SVE)

Reading Rate/Speed

Speed Reader II (Davidson & Associates)

Word Processing

Appleworks (Claris)
Magic Slate II [40-column version, middle school] (Sunburst)
Telewriter-64 (Cognitec)

Expanded Word Processing

Writing Adventure (Developmental Learning Materials)
Superprint (Scholastic)
Print Shop (Broderbund)
Create with Garfield-Deluxe (Developmental Learning Materials)

Desktop Publishing

Newsroom (Springboard)
Personal Publisher (Microzine)
Publish It (Timeworks)

Telecommunications Simulation

Kidmail (CUE Softsway)
Electronic Mailbag: An Electronic Mailsimulator [also for IBM compatibles] (EXSYM)

Keyboarding/Typing

Typing Tutor IV [also for Commodore 64] (Simon & Schuster)
TYPE! (Broderbund)
Type To Learn (Sunburst)

Databases

Bank Street School Filer (Sunburst)
Bookwhiz (Educational Testing Service)
Electronic Sign (HI-TECH Electronic Sign)

Teacher Utilities

Authoring Computer Programs Without Programming
Hypercard (Apple)
Tutor Tech (TechWare)

Checking Student Writing

WordMAP I [IBM compatible MS-DOS/ PC-DOS 2.0 or higher] (Linguistic Technologies)
The School Speller (Sunburst)

Creating Classroom Materials/Tests

Certificate Maker (Springboard)
Testwriter (K-12 Micro Media)
Crossword Magic (Mindscape)

Keeping Records

Classmate (Davidson)
Grade Manager (MECC) [also for IBM]

Publishers' Addresses

Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014

Broderbund
17 Paul Drive
San Rafael, CA 94903

Claris
440 Clyde Avenue
Mountain View, CA 94043

Cognitec, Inc.
704 Nob Avenue
Del Mar, CA 92014

CUE Softsway
P.O. Box 271704
Concord, CA 94527-1704

Davidson & Associates
3135 Kashiwa Street
Torrance, CA 90505

Developmental Learning Materials
DLM Teaching Resources
One DLM Park
Allen, TX 75002

Educational Activities, Inc.
P.O. Box 392
Freeport, NY 11520

Educational Testing Service
Princeton, NJ 08541

EXSYM
Building B Suite 435
301 N. Harrison Street
Princeton, NJ 08540

Focus Media, Inc.
839 Stewart Avenue
P.O. Box 865
Garden City, NY 11530

Hartley Courseware, Inc.
Box 419
Dimondale, MI 48821

HI-TECH Electronic Sign Company
4711-126 Avenue, Suite J
Clearwater, FL 34622

Hoffman Educational Systems
1720 Flower Avenue
Duarte, CA 91010

K-12 Micro Media
6 Arrow Road
Ramsey, NJ 07446

Learning Research Associates, Inc.
P.O. Box 39, Dept. 8
Roslyn Heights, NY 11577

Linguistic Technologies, Inc.
P.O. Box 708
Minden, NV 89423

MECC
3490 Lexington Avenue North
St. Paul, MN 55126

Microzine
Scholastic, Inc.
2831 East McCarty Street
Jefferson City, MO 65102

Mindscape, Inc.
3444 Dundee Road
Northbrook, IL 60062

Opportunities for Learning, Inc.
20417 Nordhoff Street
Dept. A6R
Chatsworth, CA 91311

Scholastic, Inc.
730 Broadway
New York, NY 10003

Simon & Schuster
One Gulf & Western
New York, NY 10023

Springboard
7808 Creekridge Cr.
Minneapolis, MN 55435

Sunburst Communications, Inc.
39 Washington Avenue
Pleasantville, NY 10570-2898

SVE (Society for Visual Education)
Department BL
1345 Diversey Parkway
Chicago, IL 60614-1299

TechWare, Inc.
P.O. Box 1085
Altamonte Springs, FL 32715-1085

Timeworks
444 Lake Cook Road
Deerfield, IL 60015

Books

Langhorne, Mary Jo; Donham, Jean; Gross, June; and Rehmke, Denise. *Teaching with Computers: A New Menu for the 90s*. Phoenix, Ariz.: Oryx Press, 1989.

Periodicals

Classroom Computer Learning
19 Davis Drive
Belmont, CA 94002

The Computing Teacher
International Council on Computers in Education
University of Oregon
1787 Agate Street
Eugene, OR 97403

Media & Methods
1426 Walnut Street
Philadelphia, PA 19102

Teaching and Computers
Scholastic, Inc.
730 Broadway
New York, NY 10003-9538

Florida Educational Computing Quarterly
PanHandle Center for Excellence
College of Education
Florida A&M University
Tallahassee, FL 32307

Organizations

The International Reading Association has a Special Interest Group-Computers and Reading. For information, write:

IRA
800 Barksdale Road
P.O. Box 8139
Newark, DE 19714-8139

There also are many state computer-using organizations for educators, which can be helpful to beginners in instructional computing.

Clubs

For information on organizing a student computer club in your school, write to:

Apple Computer Clubs
Apple Computer, Inc.
20525 Mariani Avenue
Ms35AA
Cupertino, CA 95014

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